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CLAIMS

What is claimed is:

1. A method comprising:

multiplying [A] by [x] to obtain [y];

wherein said [x] is a matrix of inputs, said [y] is a matrix of outputs, and said [A] is a matrix of predetermined values and multiplication operations; and

wherein said multiplication operations within said [A] are paired.

1 2. The method as in claim 1,

wherein said matrix [A] is factored into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M]; and

wherein multiplication operations within said multiplication matrix [M] are grouped for simultaneous execution.

- 3. The method as in claim 1, wherein at least one n-point discrete cosine transform (DCT) is performed.
- 1 4. The method as in claim 3, wherein multimedia compression is performed.
- 5. The method as in claim 3, wherein at least one shape adaptive discrete cosine transform (SA-DCT) is performed.
- 6. The method as in claim 1, wherein at least one n-point inverse discrete cosine transform (IDCT) is performed.
- 7. The method as in claim 6, wherein multimedia decompression is performed.
- 1 8. The method as in claim 6, wherein at least one \$A-IDCT is performed.
- 9. The method as in claim 1, implemented using single instruction multiple data (SIMD) operations.



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- 0. The method as in claim 10, implemented using MMX operations.
- 11. The method as in claim 10, implemented using PMADDWD instructions.
- 1 12. The method as in claim 1, implemented using at least one of very large scale integration (VLSI) implementation, single processor implementation, vector processing.
 - 13. A machine readable storage medium having executable instructions which, when executed by a machine, cause said machine to perform operations comprising:

multiplying [A]\by [x] to obtain [y];

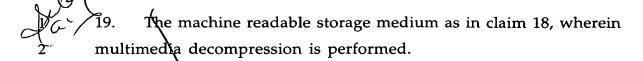
wherein said [x] is a matrix of inputs, said [y] is a matrix of outputs, and said [A] is a matrix of predetermined values and multiplication operations; and

wherein said multiplication operations within said [A] are paired.

14. The machine readable storage medium as in claim 13, wherein said matrix [A] is factored into butterfly matrix [B], shuffle matrix [S], and multiplication matrix [M]; and

wherein multiplication operations within said multiplication matrix [M] are grouped for simultaneous execution.

- 1 15. The machine readable storage medium as in claim 13, wherein at least 2 one n-point DCT is performed.
- 1 16. The machine readable storage medium as in claim 15, wherein multimedia compression is performed.
- 1 17. The machine readable storage medium as in claim 15, wherein at least 2 one SA-DCT is performed.
- 1 18. The machine readable storage medium as in claim 13, wherein at least 2 one n-point IDCT is performed.



- 1 20. The machine readable storage medium as in claim 18, wherein at least
- 2 one SA-IDCT is performed.
- 1 21. The machine readable storage medium as in claim 13, implemented
- 2 using SIMD operations.
- 1 22. The machine readable storage medium as in claim 21, implemented
- 2 using MMX operations.
- 1 23. The machine readable storage medium as in claim 22, implemented
- 2 using PMADDWD instructions
- 1 24. The machine readable storage medium as in claim13, implemented
- 2 using at least one VLSI implementation, single processor implementation,
- 3 vector processing.
- 1 25. A method comprising performing an n-point DCT or an n-point IDCT
- 2 wherein multiplication operations and addition operations within said n-
- 3 point DCT and said n-point IDCT are paired.
- 1 26. The method as in claim 25, further comprising performing SA-DCT or
- 2 SA-IDCT.
- 1 27. The method as in claim 25, implemented using instructions that can
- 2 execute multiple operations in parallel.
- 1 28. The method as in claim 27, said instructions being at least one of
- 2 MMXTM operations and Streaming SIMD Extensions.